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Industrial automation systems and integration — Integration of life-cycle data for oil and gas production facilities — Part 1: Overview and fundamental principles

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ABSTRACT:

This document provides an overview of ISO 15926 "Integration of life-cycle data for oil and gas production facilities".

KEYWORDS:

industrial data, oil and gas, facility, life-cycle, integration, overview

COMMENTS TO READER:

This document has been reviewed and noted by the ISO TC 184/SC4 Secretariat and has been determined to be ready for this ballot cycle.

Interim editorial guidelines, and an accompanying Word template, have been used in the preparation of this document. These guidelines apply the requirements of the ISO/IEC Directives 3, and appropriate requirements of the SC4 Supplementary Directives for ISO 10303.

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Foreword

ISO (the International Organization for Standardization) is a worldwide federation of national standards bodies (ISO member bodies). The work of preparing International Standards is normally carried out through ISO technical committees. Each member body interested in a subject for which a technical committee has been established has the right to be represented on that committee. International organizations, governmental and non-governmental, in liaison with ISO, also take part in the work. ISO collaborates closely with the International Electrotechnical Commission (IEC) on all matters of electrotechnical standardization.

Draft International Standards adopted by the technical committees are circulated to the member bodies for voting. Publication as an International Standard requires approval by at least 75% of the member bodies casting a vote.

International Standard ISO 15926-1 was prepared by Technical Committee ISO/TC184, *Industrial automation systems and integration*, Subcommittee SC4, *Industrial data*.

ISO 15926 consists of the following parts under the general title *Industrial automation systems and integration – Integration of life-cycle data for oil and gas production facilities*:

- Part 1, Overview and fundamental principles;
- Part 2, Data model;
- Part 3, Methodology for the development and maintenance of reference data libraries.

The structure of this International Standard is described in this part of ISO 15926.

Annexes A and B form an integral part of this part of ISO 15926.

0 Introduction

0.1 Background

Information concerning the engineering, construction and operation of oil and gas production facilities is created, used and modified by many different organizations throughout a facility's life. Economic, safety and environmental considerations demand that this information is available to owners and operators of facilities, contractors, and regulatory bodies in a consistent, integrated form. This requirement can be satisfied by specifications that prescribe the structure and meaning of data that is shared by organizations and disciplines involved in all stages of a facility's life-cycle.

The need to increase the cost efficiency of oil and gas facilities is leading to business practices that depend on the efficient integration and sharing of plant information in a computer processable form. These business practices include the following.

- Many users' needs now span more than one of the traditional information views. Safety and environment are two examples of this.
- Concurrent engineering requires design work to progress in parallel, with the state of the design being available electronically, in computer processable form, to other engineering, planning, purchasing and logistical activities.
- Significant cost savings are expected from standardization of component specifications. The information about these specifications is required in computer processable form for easy incorporation into facility designs and requirements.
- In the past, hand-over of facility design information was often restricted to design drawings and paper documents. Use of this information in managing the operation and modification of the facility was restricted to manual processes, or the information had to be redefined in a format suitable to the required application. Having the facility design and equipment information in computer processable form increases the efficiency and effectiveness of the operational phase of the facility.
- Accurate computer processable information about a facility's performance throughout its lifetime is of high value, for optimising future modifications to the facility and for designing new facilities on the basis of experience with existing facilities.

By using a consistent context for data definitions, the information used in the various aspects of the facility's life-cycle can be brought together. This allows information to be integrated, shared and exchanged in a consistent, computer processable form.

0.2 Purpose of ISO 15926

The purpose of this International Standard is to facilitate integration of data to support the life-cycle activities and processes of oil and gas production facilities. To do this, this International Standard specifies a data model that defines the meaning of the life-cycle information in a single context supporting all the views that process engineers, equipment engineers, operators, maintenance engineers and other specialists may have of the facility.

Traditionally, data associated with an oil and gas production facility have been concentrated on some individual view of the facility at a point in time. Such data are usually defined and maintained independently of other groups of users, resulting in duplicated and conflicting data that cannot be shared either within an enterprise or with business partners of an enterprise.

0.3 Description of ISO 15926

ISO 15926 is an International Standard for the representation of oil and gas production facility life-cycle information. This representation is specified by a generic, conceptual data model that is suitable as the basis for implementation in a shared database or data warehouse. The data model is designed to be used in conjunction with reference data, i.e., standard instances that represent information common to a number of users, production facilities, or both. The support for a specific life-cycle activity depends on the use of appropriate reference data in conjunction with the data model.

ISO 15926 is organized as a number of parts, each published separately. This part of ISO 15926 provides an overview. It specifies the contents and functions of the different parts of ISO 15926 and the relationships between them, and describes:

- an overview of ISO 15926;
- the fundamental principles that are the basis of ISO 15926;
- the relationship of ISO 15926 to other industrial data standards;
- definitions of terms used throughout ISO 15926.

NOTE ISO 15926 is complemented by a standard reference data library for the process industries. This is a proposed new standard that builds on ISO 15926 and ISO 10303 (particularly ISO 10303-221). The new standard will consist of three parts: the initial content of the reference data library, methods for developing and validating reference data, and procedures for maintaining and publishing reference data libraries. The last two of these play the roles of technical standard and procedure standard respectively for an ISO Register of reference data. It is expected that the technical standard will supersede Part 3 of ISO 15926. Full references to this standard will be added when it is approved as a New Work Item.

0.4 Typographical conventions

The following typographical conventions are used in this International Standard.

A numbered reference enclosed in brackets (for example, “[2]”) is a reference to a document that is listed in the Bibliography.

In this International Standard the same English language words may be used to refer to an object in the real world or to a concept, and as the name of an EXPRESS data type that represents this object or concept. The following typographical convention is used to distinguish between these. If a word or phrase occurs in the same typeface as narrative text, the referent is the object or concept. If the word or phrase occurs in a bold typeface, the referent is the EXPRESS data type. Names of EXPRESS schemas also occur in a bold typeface.

The name of an EXPRESS data type may be used to refer to the data type itself, or to an instance of the data type. The distinction between these uses is normally clear from the context. If there is a likelihood of ambiguity, the phrase “entity data type” or “instance(s) of” is included in the text.

Double quotation marks “ ” denote quoted text. Single quotation marks ‘ ’ denote particular text string values.

Some components of this International Standard are available in electronic form. This access is provided through the specification of Universal Resource Locators (URLs) that identify the location of these files on the Internet. If there is difficulty accessing these files contact the ISO Central Secretariat, or contact the ISO TC 184/SC4 Secretariat directly at: sc4sec@cme.nist.gov.

Industrial automation systems and integration — Integration of life-cycle data for oil and gas production facilities — Part 1: Overview and fundamental principles

1 Scope

This International Standard specifies a representation of information associated with engineering, construction and operation of oil and gas production facilities. This representation supports:

- the information requirements of the oil and gas industries in all phases of a facility's life-cycle;
- sharing and integration of information amongst all parties involved in the facility's life-cycle.

The following are within the scope of ISO 15926:

- a generic, conceptual data model that supports representation of all life-cycle aspects of an oil and gas production facility;
- methods for developing and validating the content of reference data libraries that represent information common to many oil and gas production facilities and users;
- conformance to the requirements of this International Standard.

The scope of business activities that are supported by the International Standard is illustrated in Figure 1, which shows the main activities and data flows associated with the life-cycle of a facility.

NOTE 1 This Figure is based on the Process Plant Engineering Activity Model [8].

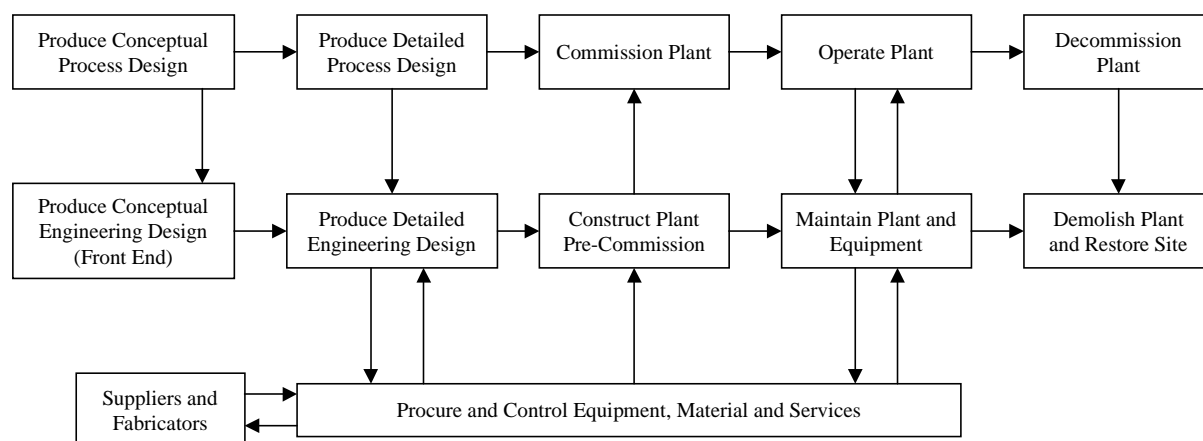


Figure 1 – Activity model of the oil and gas production facility life-cycle

NOTE 2 The support for a specific life-cycle activity depends on the use of appropriate reference data in conjunction with the data model defined in ISO 15926-2.

EXAMPLE A reference data library covering technical data about process systems, electrical systems and instrumentation systems can support design, engineering and maintenance activities for these systems within an oil and gas production facility.

The following are outside the scope of ISO 15926:

- commercial, business, and administrative data that is not directly related to the engineering, operation and maintenance of oil and gas production facilities;
- specification of interfaces or transformations that provide particular external views or input/output capabilities with respect to facility life-cycle data.

This International Standard is applicable to implementation of databases or data warehouses that enable integration and sharing of data amongst different participants in the life-cycle of an oil and gas production facility. The generic data model specified in ISO 15926-2 provides a suitable conceptual data model for such a database or data warehouse.

NOTE 3 See 5.2 for further information concerning the nature of conceptual data models.

This part of ISO 15926 provides an overview of this International Standard. The scopes of the other parts of ISO 15926 are defined within those parts.

2 Normative references

The following normative documents contain provisions which, through reference in this text, constitute provisions of this part of ISO 15926. For dated references, subsequent amendments to, or revisions of, any of these publications do not apply. However, parties to agreements based on this International Standard are encouraged to investigate the possibility of applying the most recent editions of the normative documents indicated below. For undated references, the latest edition of the normative document referred to applies. Members of ISO and IEC maintain registers of currently valid International Standards.

ISO/IEC 8824-1:1994, *Information technology — Open systems interconnection — Abstract syntax notation one (ASN.1) — Part 1: Specification of basic notation*.

ISO 10303-1:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 1: Overview and fundamental principles*.

ISO 10303-11:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 11: The EXPRESS language reference manual*.

ISO 10303-21:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 21: Implementation methods: Clear text encoding of the exchange structure*.

ISO 10303-22: 1998, *Industrial automation systems and integration — Product data representation and exchange — Part 22: Implementation methods: Standard data access interface*.

ISO 10303-31:1994, *Industrial automation systems and integration — Product data representation and exchange — Part 31: Conformance testing methodology and framework: General concepts*.

ISO 10303-34:—¹⁾, *Industrial automation systems and integration — Product data representation and exchange — Part 34: Conformance testing methodology and framework: Abstract test methods*.

ISO 10303-35:—¹⁾, *Industrial automation systems and integration — Product data representation and exchange — Part 35: Conformance testing methodology and framework: Abstract test methods for SDAI*.

¹⁾ To be published.

ISO 10303-221:—¹⁾, *Industrial automation systems and integration — Product data representation and exchange — Part 221: Application protocol: Functional data and their schematic representation for process plants*.

ISO 13584-1:—¹⁾, *Industrial automation systems and integration — Parts library — Part 1: Overview and fundamental principles*.

ISO 15926-2:—¹⁾, *Industrial automation systems and integration — Integration of life-cycle data for oil and gas production facilities — Part 2: Data model*.

ISO 15926-3:—¹⁾, *Industrial automation systems and integration — Integration of life-cycle data for oil and gas production facilities — Part 3: Methodology for the development and maintenance of reference data libraries*.

3 Terms, definitions, and abbreviations

For the purposes of this part of ISO 15926, the following terms, definitions and abbreviations apply; those taken or adapted from ISO 10303-1:1994 are repeated below for convenience.

NOTE Definitions copied verbatim from ISO 10303-1:1994 are followed by “[ISO 10303-1]”. Definitions that have been adapted from ISO 10303-1 are followed by an explanatory note.

3.1

abstract test suite

a specification that contains the set of abstract test cases necessary for conformance testing of an implementation

NOTE Adapted from ISO 10303-1.

3.2

ANSI/SPARC

American National Standards Institute/Standards Planning and Research Committee

3.3

application object

a thing that can have its existence recorded

NOTE This is a different definition of this term from that found in ISO 10303-1. This definition is consistent with the use of this term in the data model defined in ISO 15926-2.

3.4

application object instance

an instance that represents a particular application object

3.5

application protocol

a part of ISO 10303 that specifies a data model that satisfies the scope and information requirements of a specific application

NOTE Adapted from ISO 10303-1.

3.6

common model

the part of the data model that is specified in ISO 15926-2 that is also described in the application reference model of ISO 10303-221

3.7

conceptual data model

A data model in the ANSI/SPARC Three Schema Architecture, in which the structure of data is represented in a form independent of any physical storage or external presentation format.

NOTE Adapted from the IDEF1X specification [3].

3.8

data

a representation of information in a formal manner suitable for communication, interpretation, or processing by human beings or computers

[ISO 10303-1]

3.9

data store

a computer system that allows data to be stored for future reference

3.10

data warehouse

a data store in which related data are merged to provide an integrated set of data containing no duplication or redundancy of information, and which supports many different application viewpoints

3.11

distinct facility data

facility life-cycle data that represents information that is distinct to a particular oil and gas production facility

3.12

exchange file

a computer-interpretable format used for storing, accessing, transferring and archiving data

NOTE Adapted from the definition of “exchange structure” in ISO 10303-1.

3.13

facility life-cycle data

data that represents, in computer processable form, information about one or more oil and gas production facilities

3.14

implementation method

a technique used by computer systems to exchange data that is described using the EXPRESS data specification language

NOTE Adapted from ISO 10303-1.

3.15

information

facts, concepts, or instructions

[ISO 10303-1]

3.16

instance

data that represents, in computer processable form, some real world thing

NOTE This is a different definition of this term from that found in ISO 10303-11.

3.17

reference data

facility life-cycle data, in the form of application object instances, that represents oil and gas production facilities according to the common model

3.18**reference data library**

a managed collection of reference data

4 Overview of ISO 15926

ISO 15926 is divided into a number of parts. Each part has a unique function.

ISO 15926-1 (this part) provides an overview of ISO 15926.

ISO 15926-2 specifies a generic, conceptual data model that supports representation of all life-cycle aspects of an oil and gas production facility.

ISO 15926-3 specifies methods for developing and validating reference data libraries.

5 Fundamental principles

5.1 Architecture

The architecture that underlies this International Standard is illustrated in Figure 2. The data that describes a particular facility is structured according to the generic data model. Consistency of meaning within the distinct facility data, and across multiple sets of distinct facility data, is provided through reference data. The data model defines a structure to hold information about application objects. Reference data consists of application object instances that hold information about application objects of shared or common interest.

The data model supports representation of both classes and individuals as instances with attribute values. Characteristics common to the class members are defined once as computer processable data. Characteristics of particular items are then specified by reference to the appropriate classes.

EXAMPLE A particular pipe may be identified as a member of the class “6 inch pipe”, thereby specifying the particular pipe’s dimensions to be within the range of possible dimensions specified for the class.

Information about particular items that conform, or are intended to conform, to standards or to standardized engineering practices is represented in a concise and accurate form, without duplication. The detailed classes that have been recognised in the information associated with oil and gas facilities are defined as reference data.

NOTE ISO 15926-3 defines methods for developing and validating reference data.

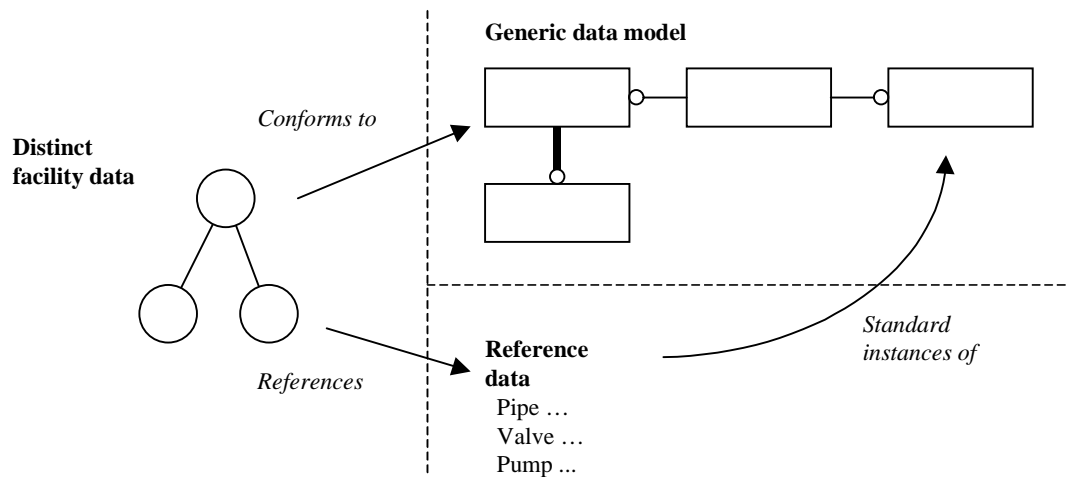


Figure 2 - Architecture

5.2 Conceptual data models

The data model specified in ISO 15926-2 is a conceptual data model as described in the ANSI/SPARC architecture.

NOTE The ANSI/SPARC architecture is described in [1].

The model excludes all business rules that are appropriate to specific applications, to enable integration of information and to give a stable and flexible model with respect to developing and changing business practices.

The ANSI/SPARC three-level architecture identifies three types of data model:

- a) External model: the data structure corresponds to a view of data for a particular purpose that includes rules about the data that are appropriate to the particular purpose.
- b) Conceptual data model: a neutral model that is capable of supporting any valid view that falls within its scope. Such models can only include rules for data that are universally true across its entire scope for the envisaged life of the model. As a consequence most rules or constraints arising from particular business uses of data are excluded from conceptual data models.
- c) Physical model: a definition of the way data is stored. The entity types reflect things that are important for storage and access and not the business meaning of the data.

These concepts are illustrated in Figure 3.

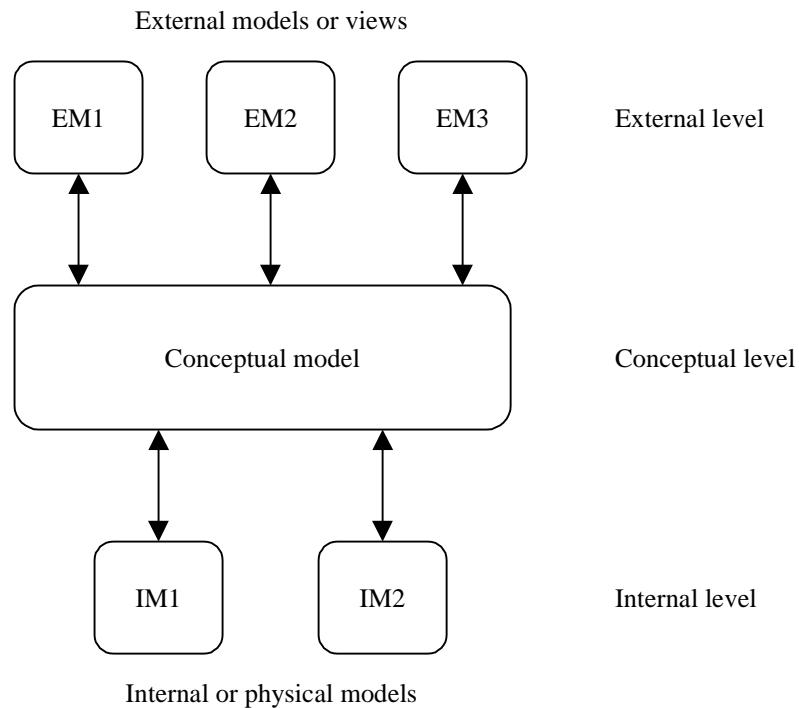


Figure 3 - ANSI/SPARC three-level architecture

5.3 Registration and maintenance of reference data

As described in 5.1 implementation and use of this International Standard requires both a conceptual data model and reference data. The conceptual data model is specified in ISO 15926-2. A reference data library may not include all reference data that is required for all implementations of this International Standard. Application object instances can be added, removed or updated and new revisions of the reference data library published, as shown in Figure 4 below.

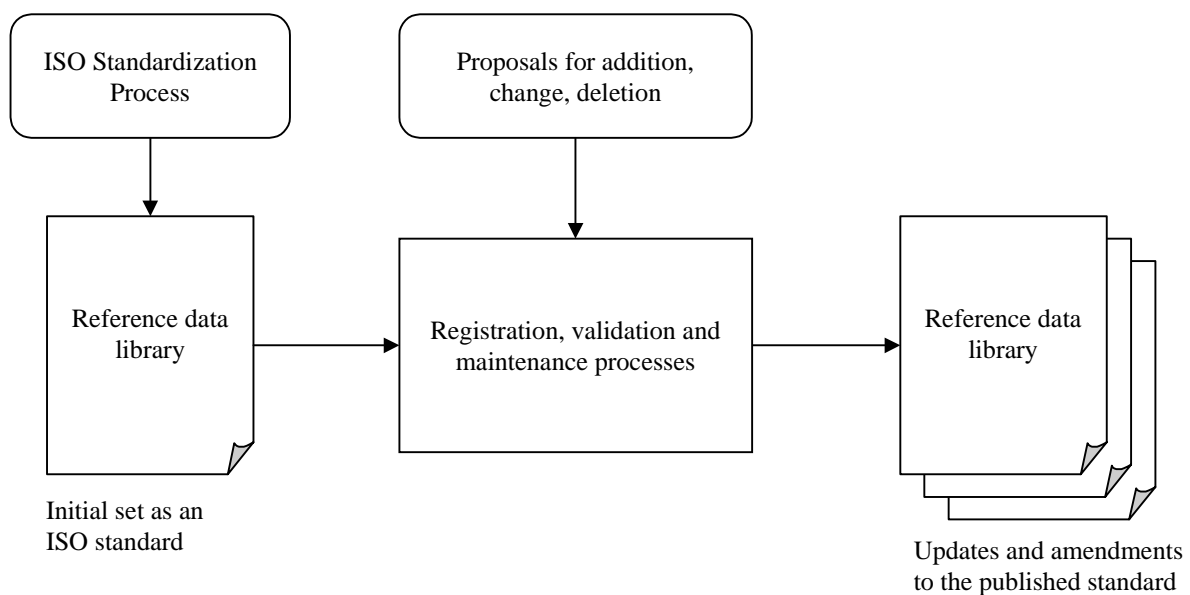


Figure 4 – Maintenance of reference data

6 Conformance

6.1 Overview

The conformance requirements of this International Standard state how the conceptual data model and reference data constrain conforming computer implementations.

A conforming implementation of this International Standard is one of the following:

- a) an exchange file encoded according to ISO 10303-21 and the model specified in ISO 15926-2;
- b) a database, data warehouse, or other information system that supports storage, management, manipulation, and retrieval of data according to the model specified in ISO 15926-2.

Conformance of database, data warehouse or other information systems is described in terms of the interfaces that the system supports with respect to two system implementation forms, as follows:

- a) an exchange file interface that allows conformant exchange files to be written or read by the system;
- b) an application programming interface (API) whereby data can be stored and then data added, deleted, updated and queried. Two levels of API conformance are specified: a general level that is not specific to any implementation technology, and a specific level based on ISO 10303-22.

NOTE ISO 15926-2 specifies a conceptual model; therefore this International Standard does not prescribe the structures that exist within a database or other implementation.

The information content of a conforming implementation of this International Standard may be constrained to include part or all of the reference data described in a specific reference data library.

6.2 Exchange files

An exchange file conforms to the requirements of this International Standard if it satisfies the syntactic conformance requirements specified in clause 5.3 of ISO 10303-21 and satisfies the schema conformance requirements specified in clause 5.3 of ISO 10303-21 combined with the data model specified in ISO 15926-2. Every conforming exchange file shall apply the external mapping specified in clause 11.2.5.3 of ISO 10303-21.

6.3 Information system interfaces

6.3.1 Exchange file interface

6.3.1.1 Implementation requirements

An information system conforming to ISO 15926 shall provide an exchange file interface to read and write files that exhibit exchange file conformance as defined in 6.2.

Operation of the read interface shall result in the information encoded in the exchange file being available through the other interfaces of the system as instances of the data model specified in ISO 15926-2.

EXAMPLE 1 If an exchange file that contains information about the design of a heat exchanger is presented to the exchange file interface of a system that conforms to ISO 15926, then that design information should be transferred into the internal data structures of the system and be available for use through any other system interface.

Operation of the write interface shall result in a selected set of instances being encoded as a conformant exchange file as defined in 6.2, where these instances

- a) conform to the data model that is specified in ISO 15926-2, and

- b) are stored in the conformant system.

EXAMPLE 2 If a conformant system holds information about pipes, piping components and their interconnections, the same information should be found in the resulting exchange file.

6.3.1.2 Exchange file interface testing

The general principles of conformance testing defined in ISO 10303-31 and the abstract test methods defined in ISO 10303-34 apply to testing of exchange file interface implementations of this International Standard. This International Standard does not include standard Abstract Test Suites.

NOTE Abstract Test Suites may be defined by national or international standards bodies, trade associations, industry consortia, etc.

6.3.2 Application programming interface

6.3.2.1 General requirements

An information system conforming to ISO 15926 shall provide a programming interface that enables instances to be manipulated by reference to their entity data types and their attribute types as defined by the data model specified in ISO 15926-2. The programming interface shall support the following operations:

- a) creation of new instances of any valid entity data type, together with valid attribute values for these instances;

NOTE 1 The data model specified in ISO 15926-2 restricts the valid combinations of entity data types that may type an instance and the types of attributes the instance may have.

- b) deletion of instances;

- c) selection of groups of instances according to their entity data type(s) and attribute values.

NOTE 2 Due to the structure of the data model specified in ISO 15926-2 all instances are complex, with the exception of instances whose type is **application_object** in combination with no subtypes.

EXAMPLE 1 Selection of instances whose type includes **application_object** selects all instances in the data store.

EXAMPLE 2 Selection of instances whose type is exactly (**application_object & class**) excludes instances of all subtypes of **class**, as well as instances of **individual**.

A data store programmable interface implementation that claims conformance to this International Standard shall at least support the operations listed above.

6.3.2.2 Data access interface conforming to ISO 10303-22

A data store programmable interface implementation of this International Standard can also conform to ISO 10303-22 and so be consistent with one of the levels of transaction specified in clause 11 of ISO 10303-22. Such an implementation shall combine the data access interface specification of ISO 10303-22, one or more SDAI language bindings, and the data model specified in ISO 15926-2.

6.3.2.3 Interface testing

The general principles of conformance testing defined in ISO 10303-31 apply to testing of programmable interface implementations of this International Standard. The abstract test methods defined in ISO 10303-35 apply to data access interface implementations that also conform to ISO 10303-22.

Conformance testing of a data store implementation shall consist of:

- a) checking the presence of all the schema entity data type names in the interface;

- b) checking the presence of all attribute names in the interface;
- c) checking the constraints on the attribute data types to be in accordance with the schema.

7 Relationship to other industrial data standards

ISO 15926 can be used in conjunction with other standards for industrial data. Such standards fall into two categories:

- standards that specify the representation of industrial information within computer systems and communications between computer systems, and
- standards that specify data elements and their meanings, independent of particular representation.

NOTE These categories are not mutually exclusive. Standards such as ISO 10303 Application Protocols specify the representation and meaning of data.

7.1 Industrial data representation standards

ISO 15926 is complementary to a number of other standards for the representation of industrial data.

7.1.1 ISO 10303 “Product data representation and exchange”

This International Standard makes use of ISO 10303-11 “EXPRESS” for specification of data models. Implementations of this International Standard may be based on any implementation method that has a mapping from EXPRESS.

EXAMPLE 1 Suitable implementation methods include ISO 10303-21, ISO 10303-22, and the Data Access and Exchange Facilities (DAEF) developed by the Petrotechnical Open Software Corporation (POSC) [5].

This International Standard supports representation of life-cycle data for oil and gas production facilities in a form that is suitable for implementation in a shared database or data warehouse. ISO 10303 Application Protocols provide specifications for the exchange of well-defined subsets of the total life-cycle data. ISO 10303 Application Protocols may therefore be used to specify standard interfaces for the input or output of data stored in a database or data warehouse.

EXAMPLE 2 ISO 10303-231 [4] specifies how process design information for major equipment items can be exchanged. An interface conforming to ISO 10303-231 may be used to import or export equipment design data that is stored within a database that is based on the data model specified in ISO 15926-2.

NOTE This International Standard does not specify such interfaces or transformations.

7.1.2 ISO 13584 “Parts library”

ISO 13584 provides a mechanism for representing manufacturers’ and suppliers’ product catalogue information. This mechanism is suitable for communication of catalogue information, and for the selection of parts based on a standard query interface specification. This mechanism provides an alternative representation for some of the information that can be represented using the data model specified in ISO 15926-2.

NOTE 1 ISO 13584 does not support all aspects of oil and gas facilities information, and so precludes creation and maintenance of a single integrated data representation of this information.

Parts library information represented by ISO 13584 data can be transformed to a representation that conforms to the data model specified in ISO 15926-2.

NOTE 2 The specification of such transformations are outside the scope of this International Standard.

7.2 Product and manufacturing standards

Many products, processes and materials are the subject of standards that prescribe aspects such as form, function, properties, or manufacture. Many of these standards are published as text only, and are therefore not computer processable. The information that these standards contains, however, may be represented using reference data that conforms to this International Standard. This provides a mechanism by which consistent representation of engineering information drawn from diverse international and national standards may be brought together for use in an enterprise or project.

NOTE 1 Reference data libraries may include references to product and manufacturing standards.

NOTE 2 ISO 15926-3 describes rules for representing information in product and manufacturing standards as ISO 15926 compliant reference data.

Annex A (normative)

Information object registration method

In order to provide unambiguous identification of schemas and other information objects in an open information system, this International Standard employs the registration technique defined in ISO/IEC 8824-1.

NOTE This registration technique is equivalent to that defined in 4.3 of ISO 10303-1 for information objects standardized in ISO 10303.

This technique identifies objects by their assignment to a tree structure whose root is ISO itself. Each node in the tree is identified by a sequence of integers corresponding to the index of the leaf under each node. Nodes that identify agencies that can further specify inferior nodes are called registration authorities. There is provision in this technique for having registration provided by national bodies and other identified organizations (including private corporations). A registration authority is automatically granted to the technical committee or subcommittee that prepares a standard in order to identify objects within the standard.

Thus, ISO 15926 is identified by the object identifier:

{ 1 0 15926 }

Here the initial 1 indicates ISO; the 0 following it identifies the object as a standard, and the number following that is the number of the standard. ISO/IEC 8824-1 also defines identifiers to stand in the place of these numbers; thus 'iso' has the value 1 and 'standard' has the value 0. For multi-part standards, the next number is required to be the part number. Thus, this part of ISO 15926 is identified by the object identifier:

{ iso standard 15926 part(1) }

Here, the value of the part number is given explicitly, but the notation allows us to associate a term with this value, thereby providing some semantics. The notation for values of this type is defined in clause 28 of ISO/IEC 8824-1, and the predefined assignments are specified in annex B of ISO/IEC 8824-1.

For the purposes of identifying information objects unambiguously within an open information system, ISO 15926 adopts the following conventions:

- a) The value following the part number shall be version number. By convention, the value of the version number of the first edition shall be 1. The value 0, if used at all, is reserved to refer to DIS documents.
- b) The value following the version number is used to identify the type of information object defined within the part. The value 1 shall indicate that the object so identified is a schema.
- c) The value following the object type is an integer that identifies the instance of the object type so identified.
- d) To meet the syntactic requirements of ISO/IEC 8824-1, replace each occurrence of underscore character “_” in a schema name with a hyphen when defining this value.

EXAMPLE The oil_and_gas_production_facilities schema defined in ISO 15926-2 can be identified by the value

{ iso standard 15926 part(2) version(1) object(1) oil-and-gas-production-facilities
(1) }

Annex B

(normative)

Information object registration

To provide for unambiguous identification of an information object in an open system, the object identifier

`{iso standard 15926 part{1} version {1}}`

is assigned to this part of ISO 15926. The meaning of this value is defined in ISO/IEC 8824-1, and is described in Annex A.

This is the object identifier that will apply to the published (IS) version of this part of ISO 15926.
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